

## Claims

1. A linear actuator, including:

at least one sub-module adapted to undergo reciprocal translation in a first  
5 direction;

at least one shape memory component, extending generally in said first  
direction;

means for heating said at least one shape memory component beyond the  
memory transition temperature to contract said shape memory component and  
10 urge said at least one sub-module to translate in said first direction and  
undergoing a stroke displacement.

2. The linear actuator of claim 1, wherein said means for heating includes  
an electrical circuit connected to said at least one shape memory components for  
15 ohmic heating thereof.

3. The linear actuator of claim 1, further including return spring means for  
resiliently opposing said stroke displacement.

20 4. The linear actuator of claim 3, wherein said return spring means  
generates a return force versus displacement characteristic that is optimized to  
relax and extend said at least one shape memory component with minimum  
residual strain.

5. The linear actuator of claim 4, wherein said return spring means comprises a rolamite spring assembly.

5 6. The linear actuator of claim 3, further including a fixed anchor point, and said return spring means is connected between said at least one sub-module and said fixed anchor point.

10 7. The linear actuator of claim 1, further including a housing having interior features impinging on said at least one sub-module to support said sub-module in reciprocally translating fashion.

15 8. The linear actuator of claim 1, further including means for cooling said at least one shape memory component.

9. The linear actuator of claim 1, wherein said means for cooling includes a heat-conducting fluid surrounding said at least one shape memory component.

20 10. The linear actuator of claim 3, wherein said return spring means generates a return force versus displacement characteristic that is substantially linear through a portion of the excursion of said return spring means.

11. The linear actuator of claim 3, wherein said spring means comprises a deflectable beam spring.

12. The linear actuator of claim 3, wherein said spring means comprises a  
5 bar adapted for reciprocal translation, said bar including a cam surface, and cam  
follower means impinging on said cam surface to exert a restoring force that is a  
function of the slope of said cam surface.